UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/759,611	01/16/2004	Johann Karner	H60-107 DIV	8162

7590 10/09/2007

NOTARO & MICHALOS P.C.
Suite 110
100 Dutch Hill Road
Orangeburg, NY 10962-2100

EXAMINER	
LUND, JEFFRIE ROBERT	
ART UNIT	PAPER NUMBER
1792	

MAIL DATE	DELIVERY MODE
10/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/759,611	KARNER ET AL.	
	Examiner	Art Unit	
	Jeffrie R. Lund	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *16 November 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 9-16, and 19 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 9 is indefinite in that it requires "at least one deposition configuration" in lines 14 and 15 and "two planar deposition configuration" in lines 22 and 23. It is not possible to have only one deposition configuration while also having two deposition configurations. The Examiner recommends amending claim 9 to exclude the "at least one deposition configuration" or so that the claim reads "at least two deposition configuration"

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1-8 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto, US Patent 6,017,396 in view of Karner et al, US Patent 5,753,045:

Okamoto teaches a vacuum processing apparatus that includes: two plasma discharge configurations that each have two electrodes (cathode 11, anode 12) that form two plasma beams 16 having discharge axis spaced apart and parallel to each other and in a low-voltage high-current plasma beam discharge gap between a cathode 11 and anode 12; a deposition configuration 14 holding two substrates 15, (substrate 15 is a continuous planar powder capture surface) which extend a selected distance from the beam axis along a substantial section of the discharge beam longitudinal direction and disposed between the discharge axes; a power supply 7 to independently drive each gap; a gas suction configuration (not shown); and a gas supply section 17, 18 for supplying a silicon containing gas to the discharge axis. (Figure 4 and 6)

Okamoto differs from the present invention in that Okamoto does not teach that the discharge axis A is substantially longer than any diameter of said discharge generation areas, a gas flow parallel to the discharge axis, that the cathode is a hot cathode, or Helmholtz coils to generate a magnetic field parallel to the discharge axis.

Karner et al teaches a hot cathode plasma beam discharge configuration with electrodes (cathode 3, anode 4) that has a discharge axis A that is substantially longer than any diameter of said discharge generation area, a gas inlet 29 and exhaust 26 that

cause a gas flow substantially parallel to the discharge axis, and a Helmholtz coil to generate a magnetic field parallel to the discharge axis. (Entire document, specifically, figures 1, 3, and 3a)

The motivation for replacing the cold cathode plasma beam discharge configuration of Okamoto with the hot cathode plasma beam discharge configuration of Karner et al is to provide an alternate and equivalent plasma discharge configuration, and enable the apparatus to deposit metastable layers as taught by Karner et al.

The motivation for adding the Helmholtz coil of Karner et al to the apparatus of Okamoto is to control the plasma as taught by Karner et al, and well known in the art.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the plasma discharge configuration of Okamoto with the plasma discharge configuration of Karner et al, and add the Helmholtz coil of Karner et al to the apparatus of Okamoto.

6. Alternately, claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto and Karner et al as applied to claims 1, 2, 4-8, and 18 above, and further in view of David, US Patent 6,015,597.

Okamoto and Karner et al were discussed above and teach a deposition configuration that has a continuous planar surface (i.e. flat substrate) which functions as a powder capture surface.

Okamoto and Karner et al differ from the present invention in that they do not specifically teach that the deposition configuration is configured as a powder capture surface.

David teaches a deposition configuration configured as a powder capture surface 7. (Figure 1)

The motivation for replacing the deposition configuration of Okamoto and Karner et al with the deposition configuration of David is to enable the apparatus of Okamoto and Karner et al to produce powder products as taught by David.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the deposition configuration of Okamoto and Karner et al with the deposition configuration of David.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Okamoto and Karner et al as applied to claims 1-8, and 18 above, and further in view of Matsumoto et al, US Patent 5,340,621.

Okamoto and Karner et al differ from the present invention in that they do not teach two or more plasma beam discharge configurations are provided on each side of the deposition configuration.

Matsumoto et al teaches two plasma beam discharge configurations on a side of the deposition configuration. (Figure 5)

The motivation for placing two plasma beam discharge configurations on a side of the deposition configuration is to enable the apparatus of Okamoto and Karner et al to uniformly treat large substrates as taught by Matsumoto et al. Alternately, multiple plasma beam discharge configurations will allow multiple layers or a thicker single layer to be deposited on a substrate with a single pass of the substrate. Furthermore, it has been held that the duplication of parts is obvious (see In re Harza 124 USPQ 378, and

MPEP 2144)

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a second plasma beam discharge configuration to the apparatus of Okamoto and Karner et al as taught by Matsumoto et al.

8. Claims 9-16 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al, JP 64-35914 A, in view of Matsumoto et al, US Patent 5,340,621, and Karner et al, US Patent 5,753,045.

Nakada et al teaches a vacuum processing apparatus that includes: a hot plasma discharge configuration 10 with a pair of electrodes (cathode 32 and anode 12) for forming a plasma beam 16 with a discharge axis substantially longer than any diameter of said discharge generation areas, and located between and parallel to two planar deposition configurations (support 14a, 14b, substrates 28) (substrates 28 are a continuous planar powder capture surface) which extend a selected distance from a plasma discharge configuration axis; and Helmholtz coils 26. (Figure 1 and 3)

Nakada et al differs from the present invention in that Nakada et al does not teach that: a second plasma discharge configuration with a discharge axis parallel to the first discharge axis and independently drivable from the first; a gas supply configuration with a gas flow generally parallel to the plasma discharge axis; that the cathode is a cold cathode, or a gas supply system fro supplying a carbon-, boron-, nitrogen-, hydrogen-, or silicon-containing gas.

Matsumoto et al teaches two plasma beam discharge configuration with a low-voltage high-current plasma beam discharge gap between a cathode 2 (hot or cold) and

anode 6 that form two plasma beams 7 parallel to each other, a power supply 16 to independently drive each gap, and a gas supply section 26, 27 for supplying a carbon-, nitrogen-, hydrogen-, or silicon-containing gas. (Entire document)

Karner et al teaches the a plasma processing apparatus that has a gas flow parallel to the discharge beam 1 axis A in a low-voltage high-current plasma beam discharge gap between a cathode 12 and anode 20 and connected to a power source 22. The discharge axis is disposed between multiple deposition configurations mounted on boat 24 and facing each other, and the discharge axis A is substantially longer than any diameter of said discharge generation areas. The gas supply system supplies a carbon-, boron-, nitrogen-, or hydrogen-containing gas (Entire document, specifically, figures 1, 3, and 3a) Karner et al also teaches that the gas flow parallel with the discharge beam axis produces more uniform coatings on larger deposition configurations by placing the deposition configurations parallel to the beam axis at a specific spacing for a desired plasma density such that the parallel gas flow produces a constant product (column 1 line 62 through column 2 line 27).

The motivation for using multiple independently controllable plasma discharge configurations to form multiple plasma beams in the apparatus of Nakada et al is to more uniformly distribute the plasma over the substrate as taught by Matsumoto et al. Furthermore, it has been held that the duplication of parts is obvious (see In re Harza 124 USPQ 378, and MPEP 2144).

The motivation for making the cathode of Nakada et al a cold cathode is to provide an alternate and equivalent type of cathode, and to prevent contamination

introduced by the sputtering effect of a hot cathode.

The motivation for replacing the perpendicular gas supply system of Nakada et al with the parallel gas supply system of Karner et al is to more uniformly distribute the processing gases to improve process uniformity on larger deposition configurations as taught by Karner et al.

The motivation for supplying a carbon-, nitrogen-, hydrogen-, or silicon-containing gas to the apparatus of Nakada et al is to provide a specific gas for an etching process as required by Nakada et al but not disclosed, or for a deposition process as taught by Matsumoto et al and Karner et al.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to add a second discharge configuration to the apparatus of Nakada et al as taught by Matsumoto et al, use a cold cathode as taught by Matsumoto et al, replace the gas supply system of Nakada et al with the gas supply system of Karner et al, and supply the desired gas to the apparatus of Nakada et al as taught by Matsumoto et al and Karner et al.

9. Alternately, claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nakada et al, Matsumoto et al, and Karner et al as applied to claims 9, 10, 12-16 and 19 above, and further in view of David, US Patent 6,015,597.

Nakada et al, Matsumoto et al, and Karner et al were discussed above and teach a deposition configuration that has a continuous planar surface (i.e. flat substrate) which functions as a powder capture surface.

Nakada et al, Matsumoto et al, and Karner et al differ from the present invention

in that they do not specifically teach that the deposition configuration is configured as a powder capture surface.

David teaches a deposition configuration configured as a powder capture surface 7. (Figure 1)

The motivation for replacing the deposition configuration of Nakada et al, Matsumoto et al, and Karner et al with the deposition configuration of David is to enable the apparatus of Nakada et al, Matsumoto et al, and Karner et al to produce powder products as taught by David.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the deposition configuration of Nakada et al, Matsumoto et al, and Karner et al with the deposition configuration of David.

Response to Arguments

10. Applicant's arguments with respect to claims 9-16 and 19 have been considered but are moot in view of the new ground of rejection. The Examiner believes that the rejection of claims 9-16 under Ikegaya et al in view of Karner et al and Matsumoto et al is still valid, but is inferior to the rejection of the claims under Nakada et al. Thus, the rejection in view of Ikegaya et al has been dropped.

11. Applicant's arguments filed July 24, 2007 have been fully considered but they are not persuasive.

In regard to the arguments directed to Okamoto and Karner et al, the Examiner disagrees. The Examiner believes that the Applicant has misunderstood the proposed combination and the size of the plasma beams. The proposed combination is directed at

replacing the long vertical electrodes of Okamoto with the short horizontal electrodes of Karner et al. The plasma beam of Okamoto has a long vertical axis and a small horizontal axis. Likewise, the plasma beam of Karner has a long vertical axis and a thin horizontal axis. The resultant plasma beams are the same shape, and as will be discussed below, are about the same size. Thus the plasma sources of Okamoto et al and Karner et al are equivalent, and just differ in the orientation of the electrodes. As to the size of the plasma beam, Applicant seems to think that the plasma beam of Karner et al is much larger than the plasma beam of Okamoto. Applicant points out that Okamoto teaches using a plasma beam of 8 cm to coat a 50 cm substrate, the Examiner agrees. Karner et al teaches at a radius 50 mm the plasma density is very low (few %) and rapidly goes to zero at a radius between 50 and 75 mm (figure 2), and the total beam width is between 10 and 15 cm. Thus the beams are substantially the same size. Therefore, the plasma beam of Karner et al is substantially the same as the plasma beam of Okamoto and can function in the same manner. The Examiner notes that the width of the beam is based on many factors and can readily be controlled. The Examiner further notes that the both Karner et al and Okamoto want to limit the exposure to the plasma. The degree of exposure is readily controllable by controlling the placement of the substrates, or various parameters of the plasma.

In regard to the argument that Okamoto does not supply the process gas parallel with discharge axis, the Examiner agrees. The rejection has been changed.

Conclusion

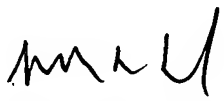
12. The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. The cited art teaches the technological background of the invention.

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrie R. Lund whose telephone number is (571) 272-1437. The examiner can normally be reached on Monday-Thursday (10:00 am - 9:00 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jeffrie R. Lund
Primary Examiner
Art Unit 1763

JRL
9/29/07